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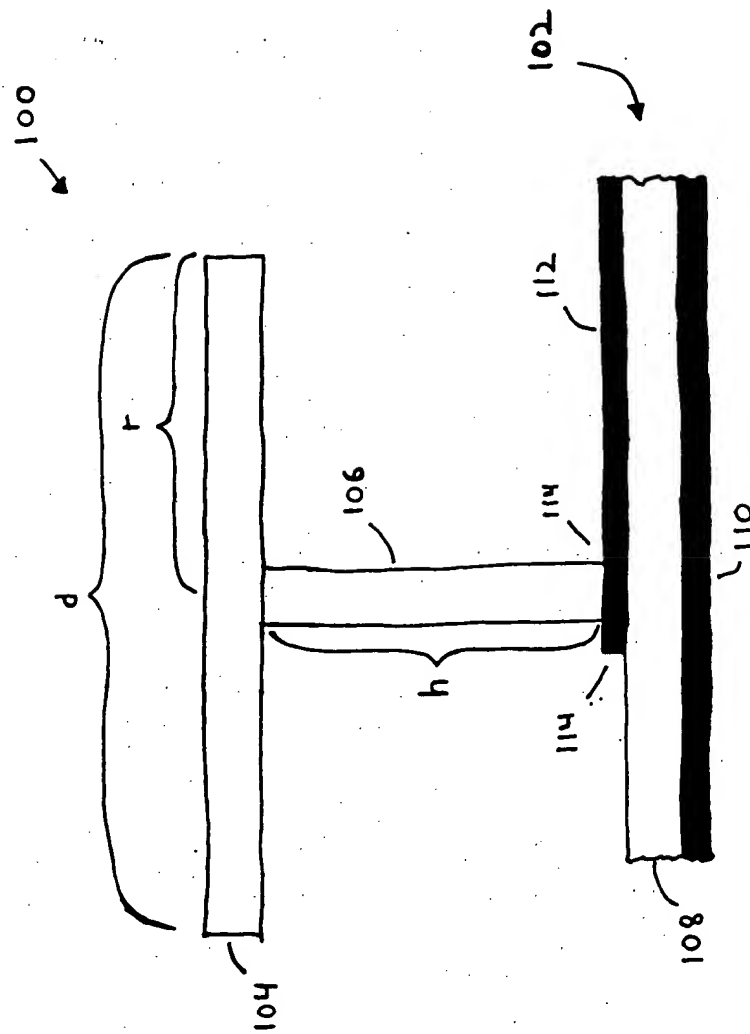
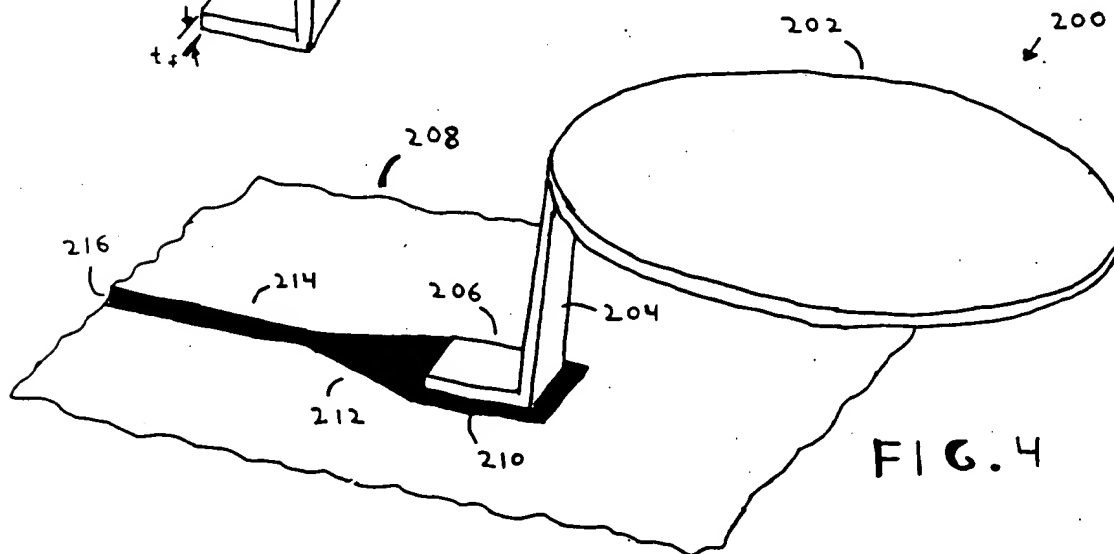
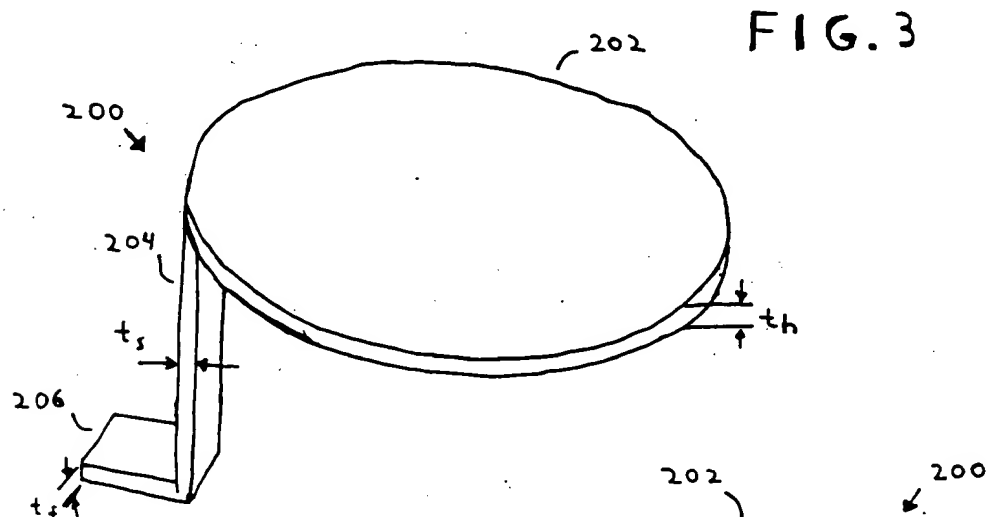
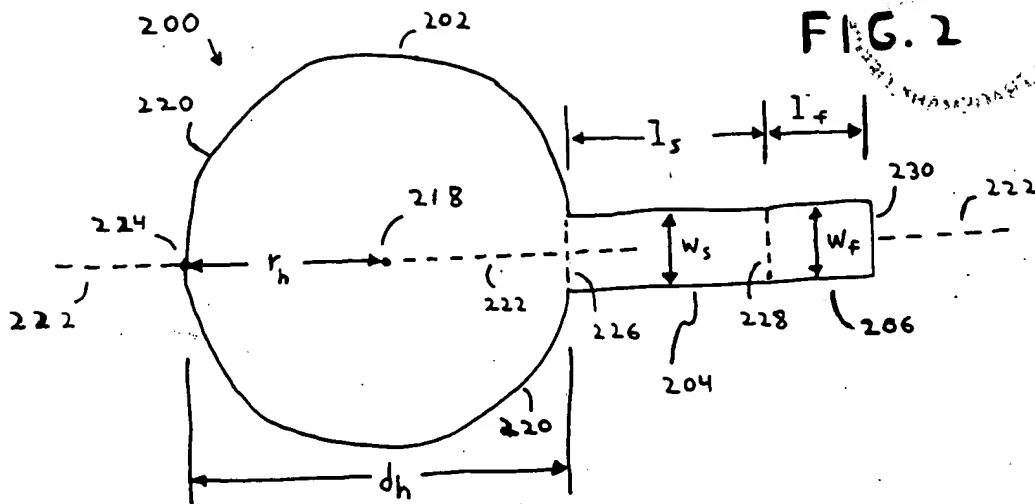


FIG. 1 PRIOR ART



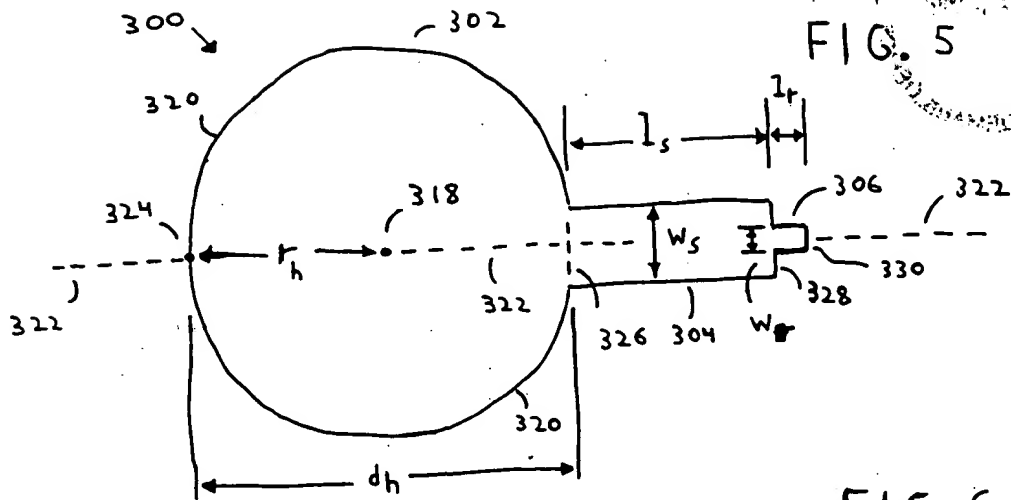


FIG. 6

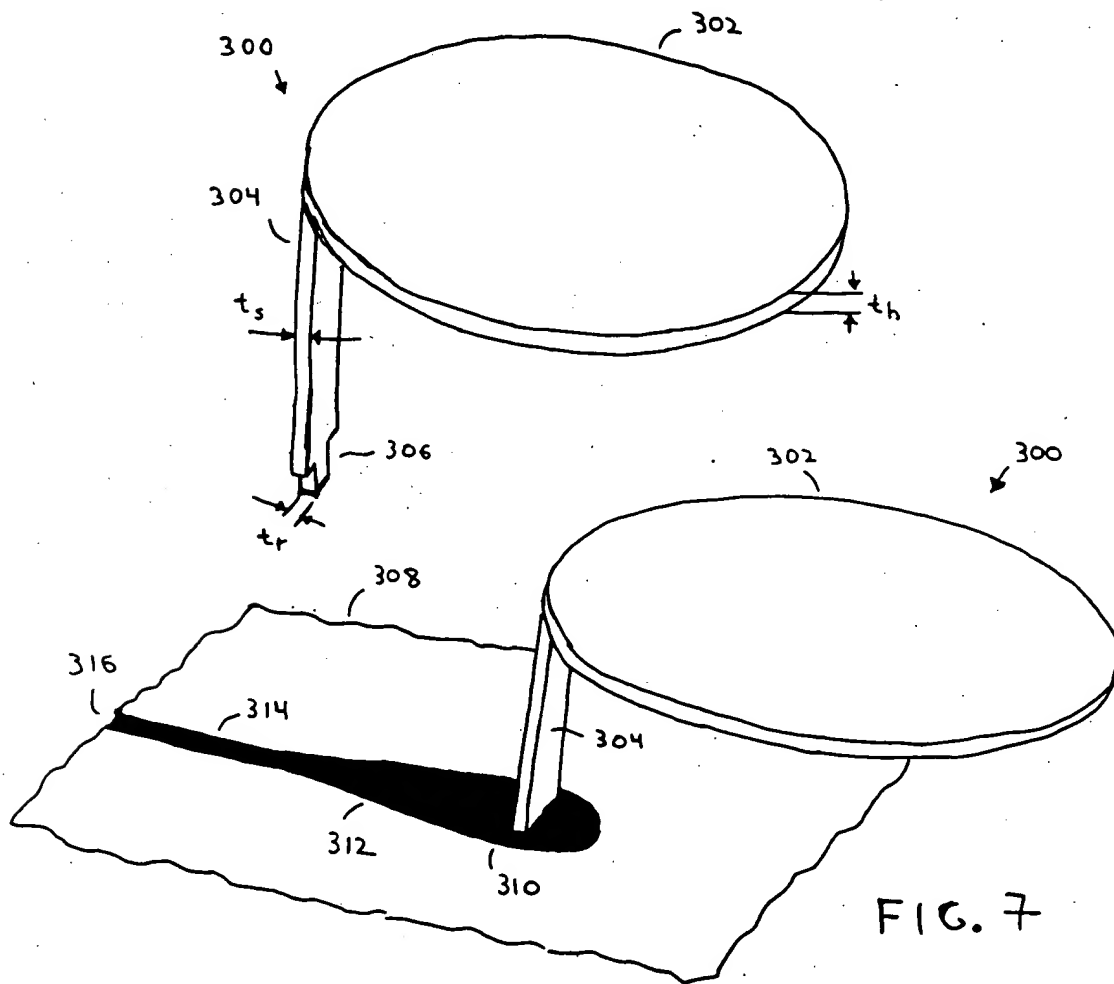
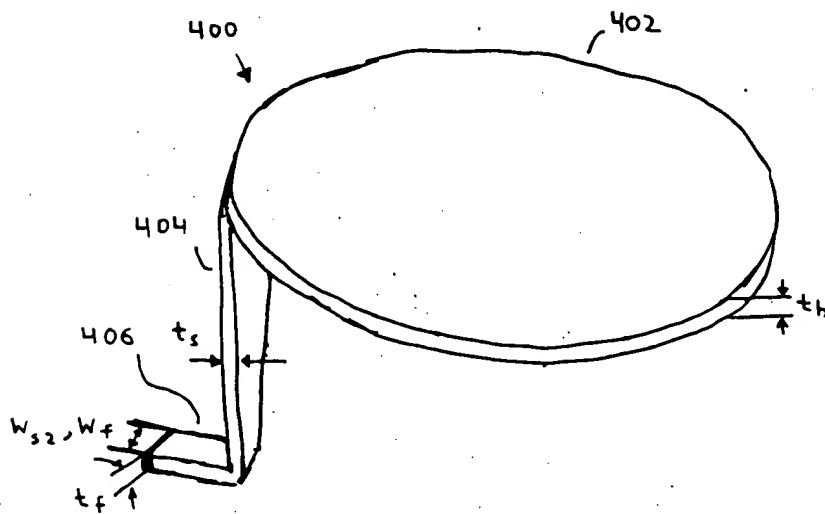
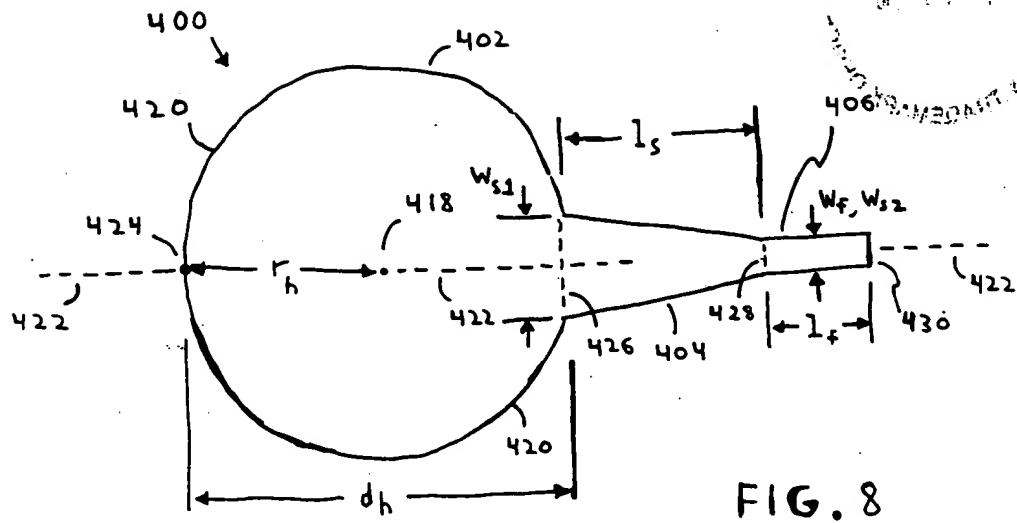


FIG. 7



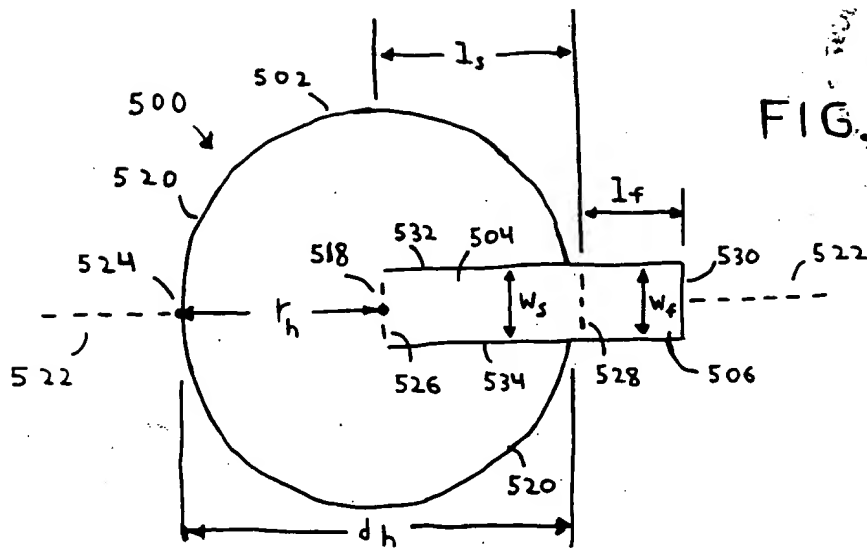


FIG. 10

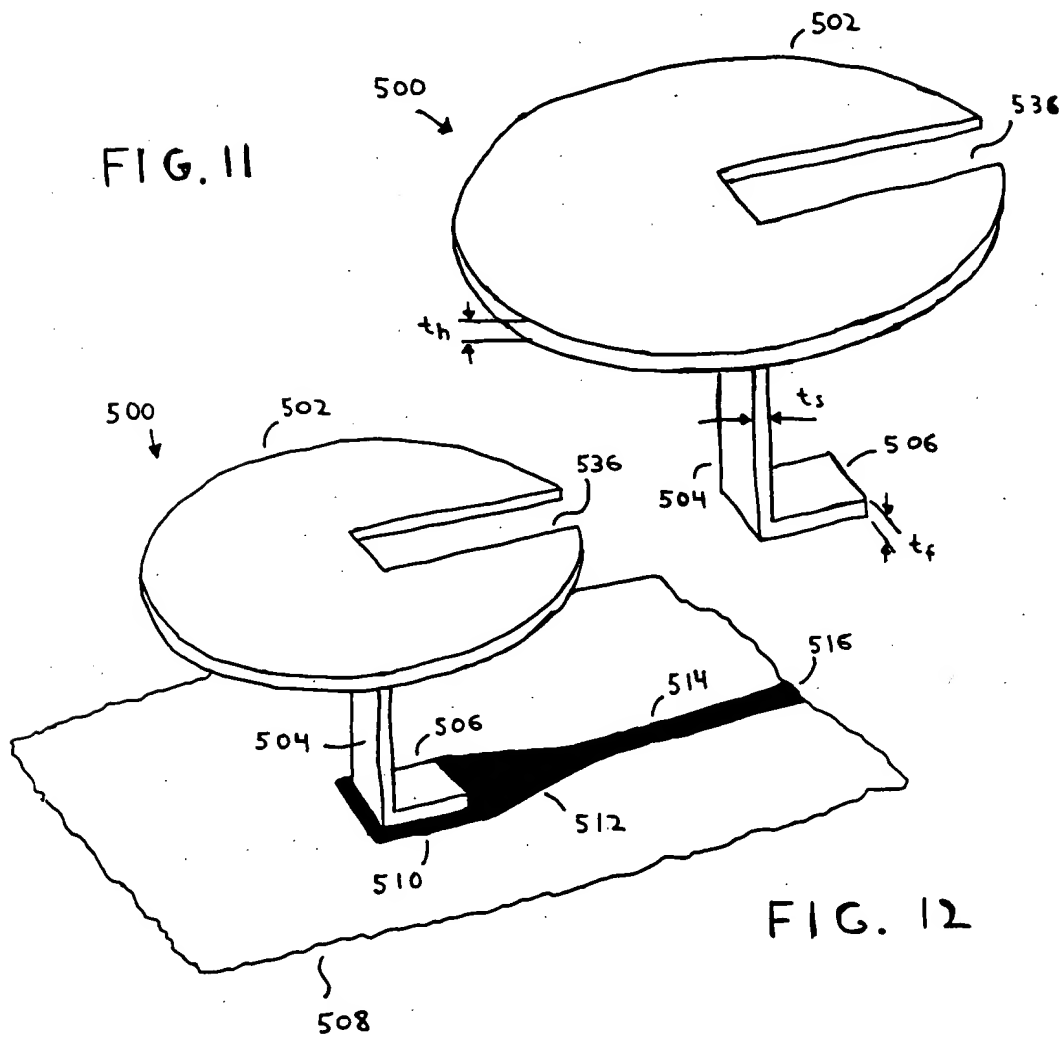


FIG. 12

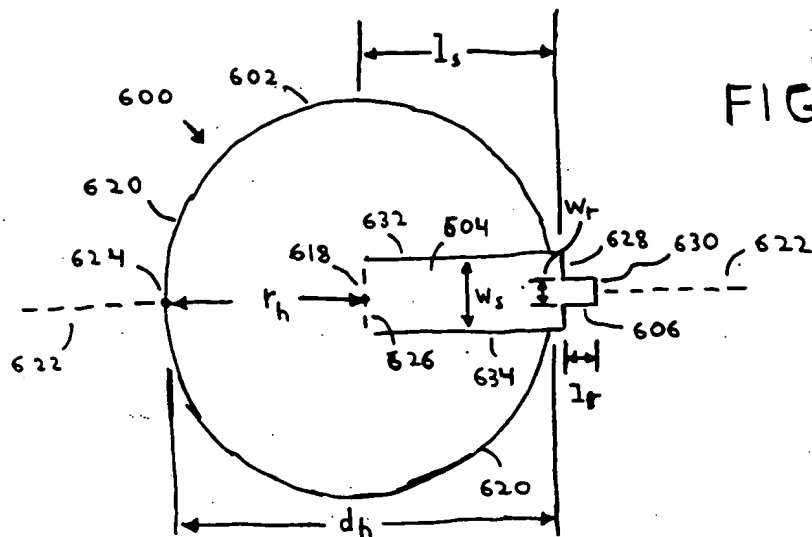


FIG. 13

FIG. 14

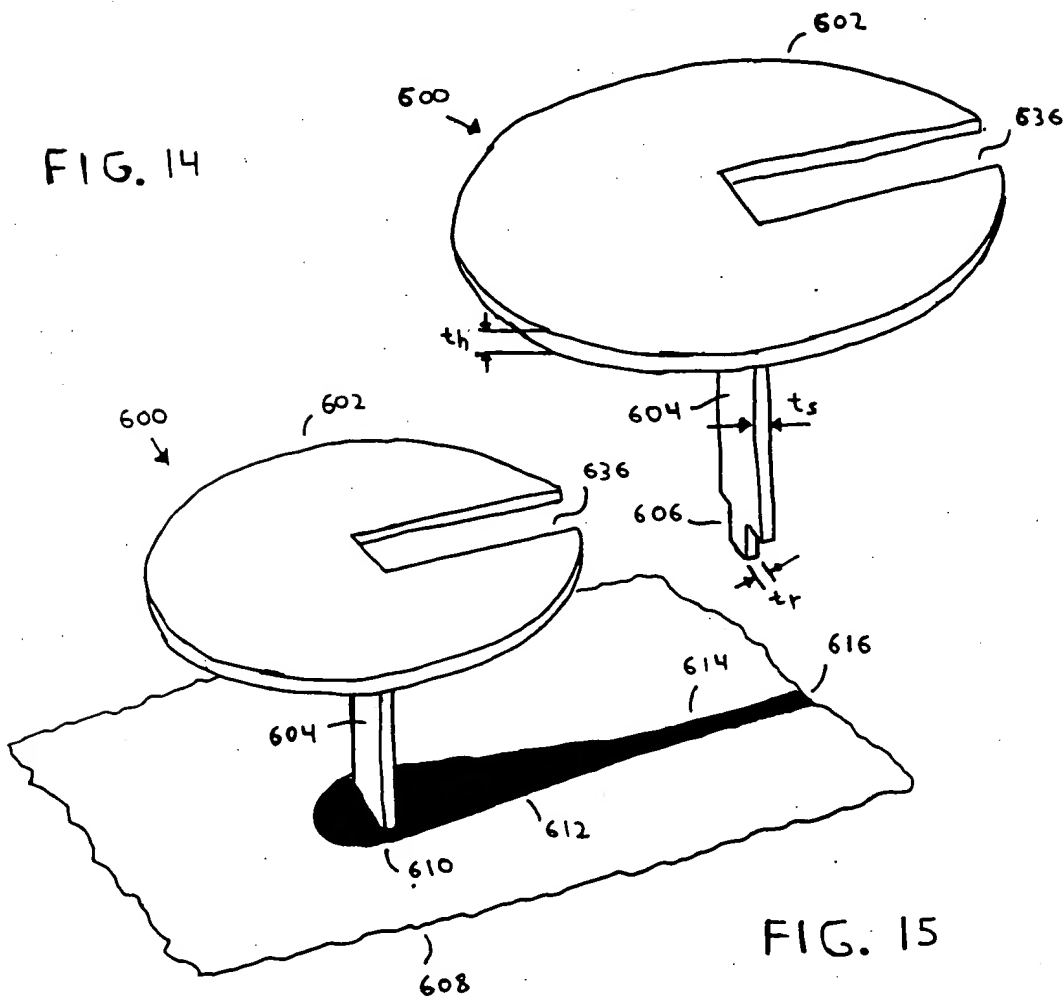


FIG. 15

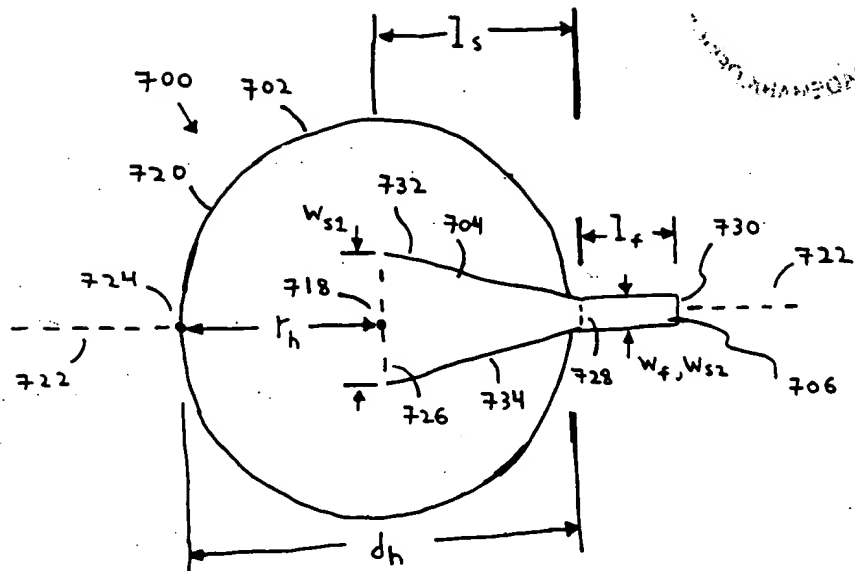


FIG. 16

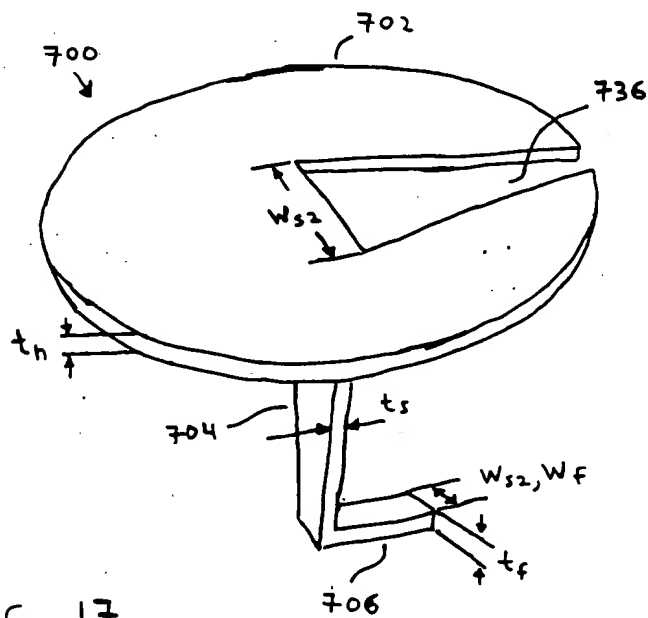


FIG. 17

FIG. 18

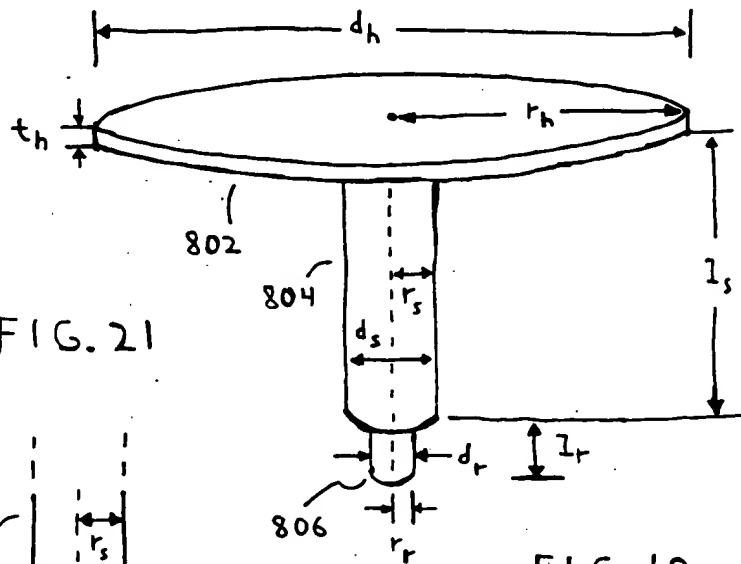
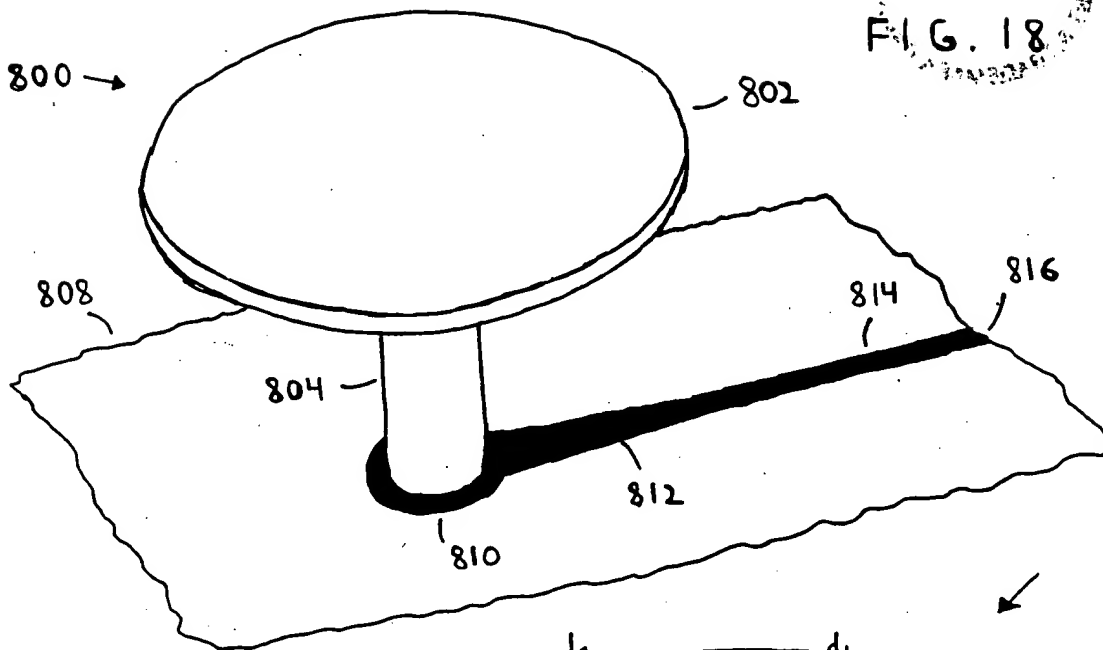


FIG. 19

FIG. 20

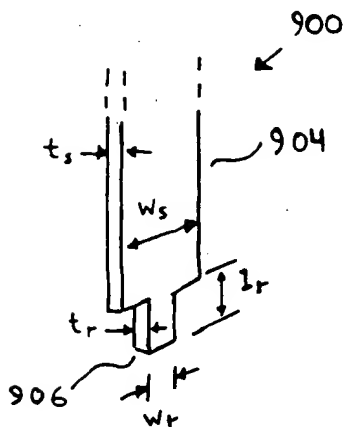
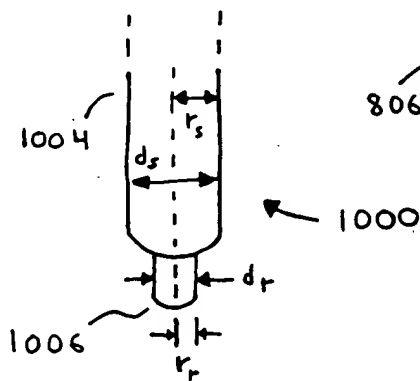


FIG. 21



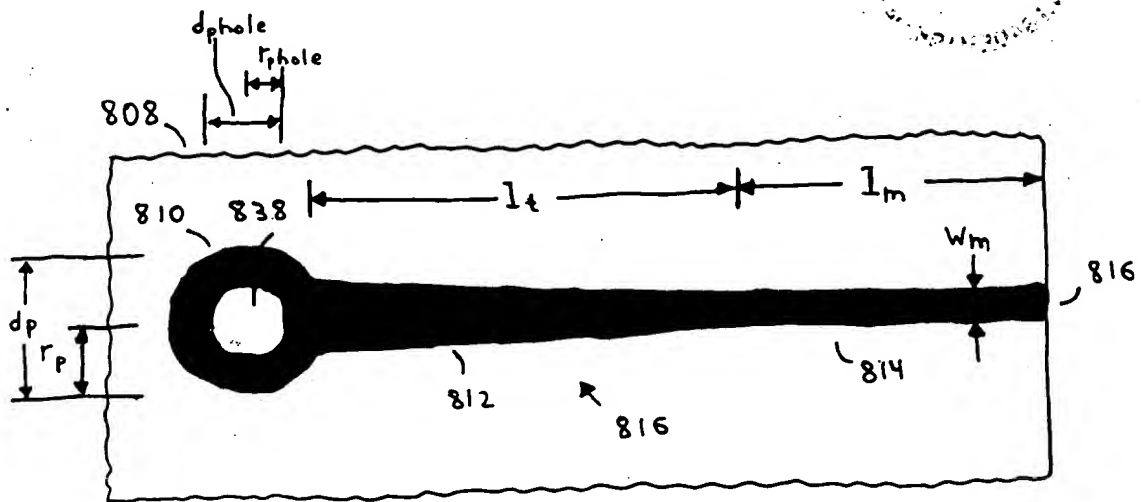


FIG. 22

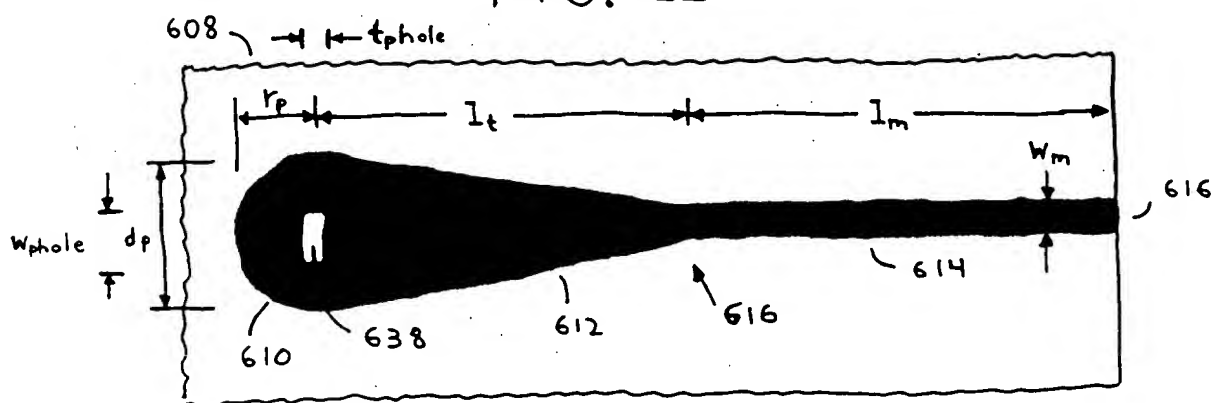


FIG. 23

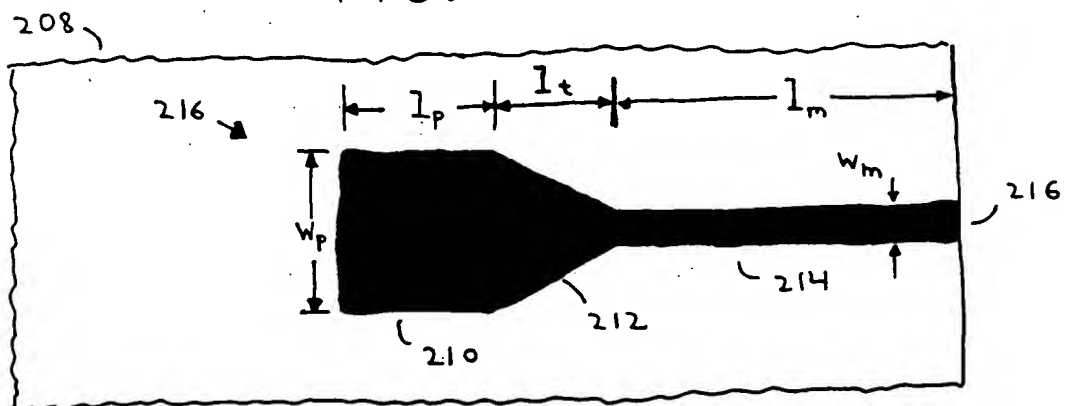


FIG. 24

FIG. 25

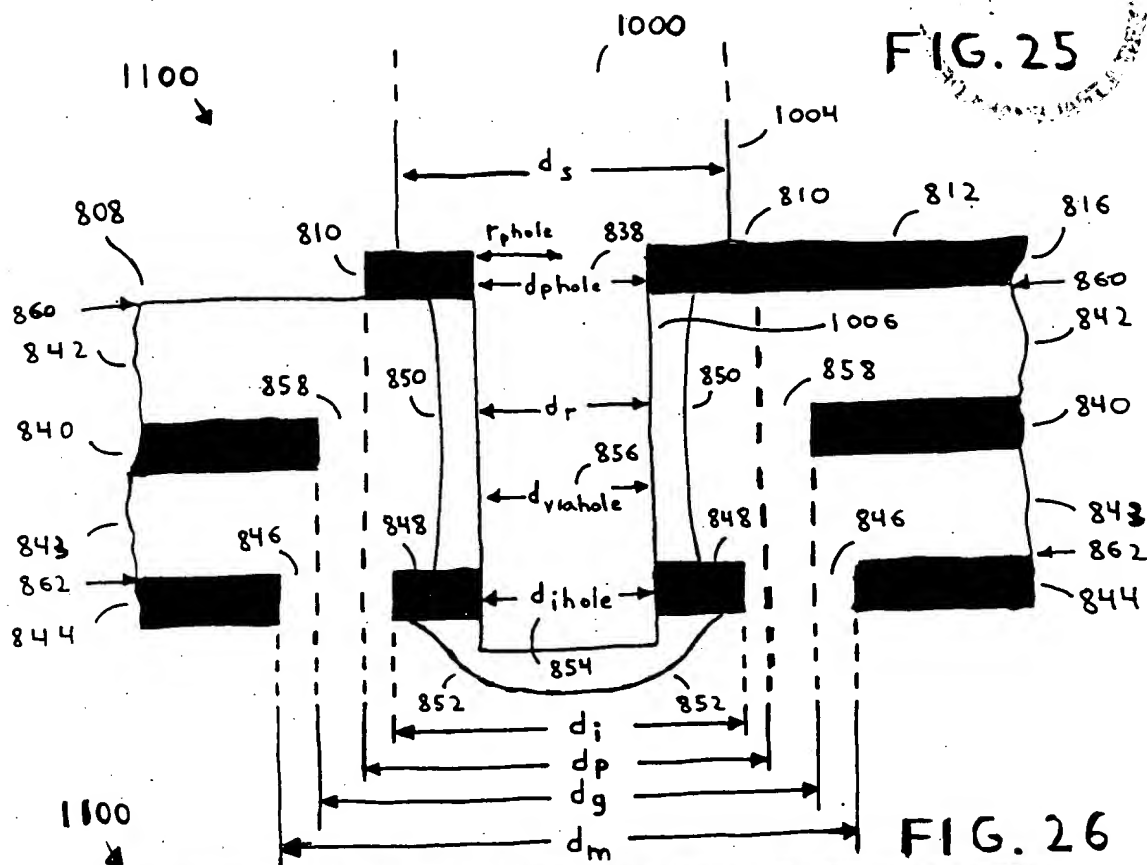


FIG. 26

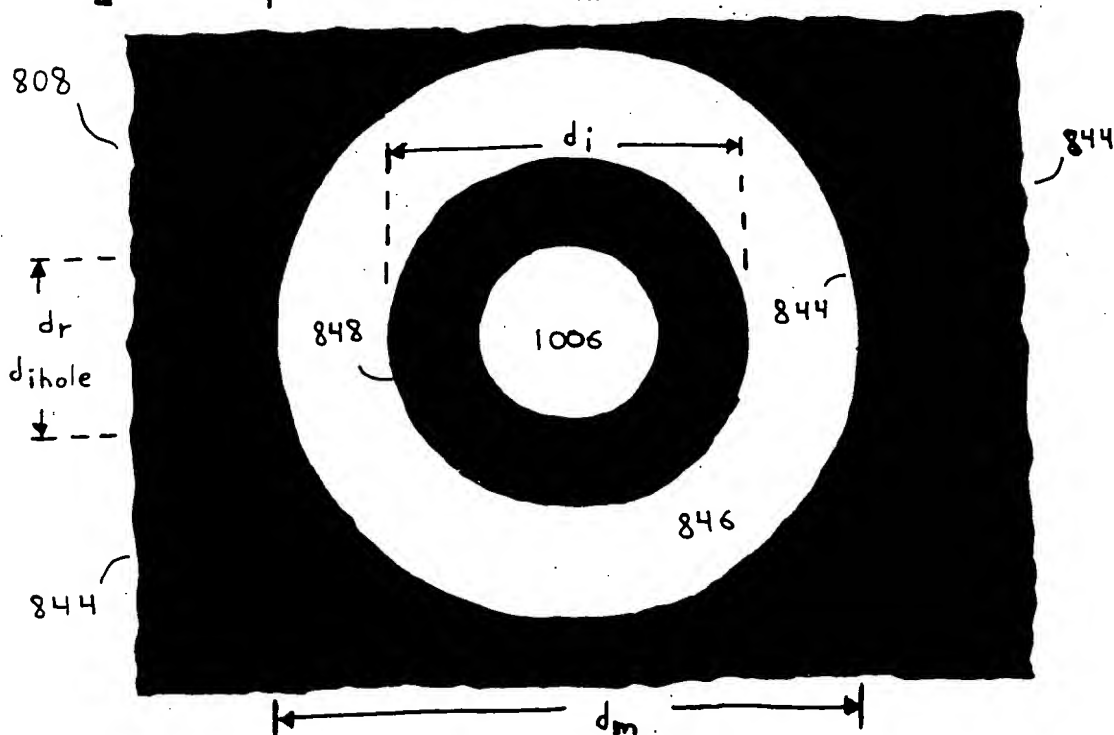
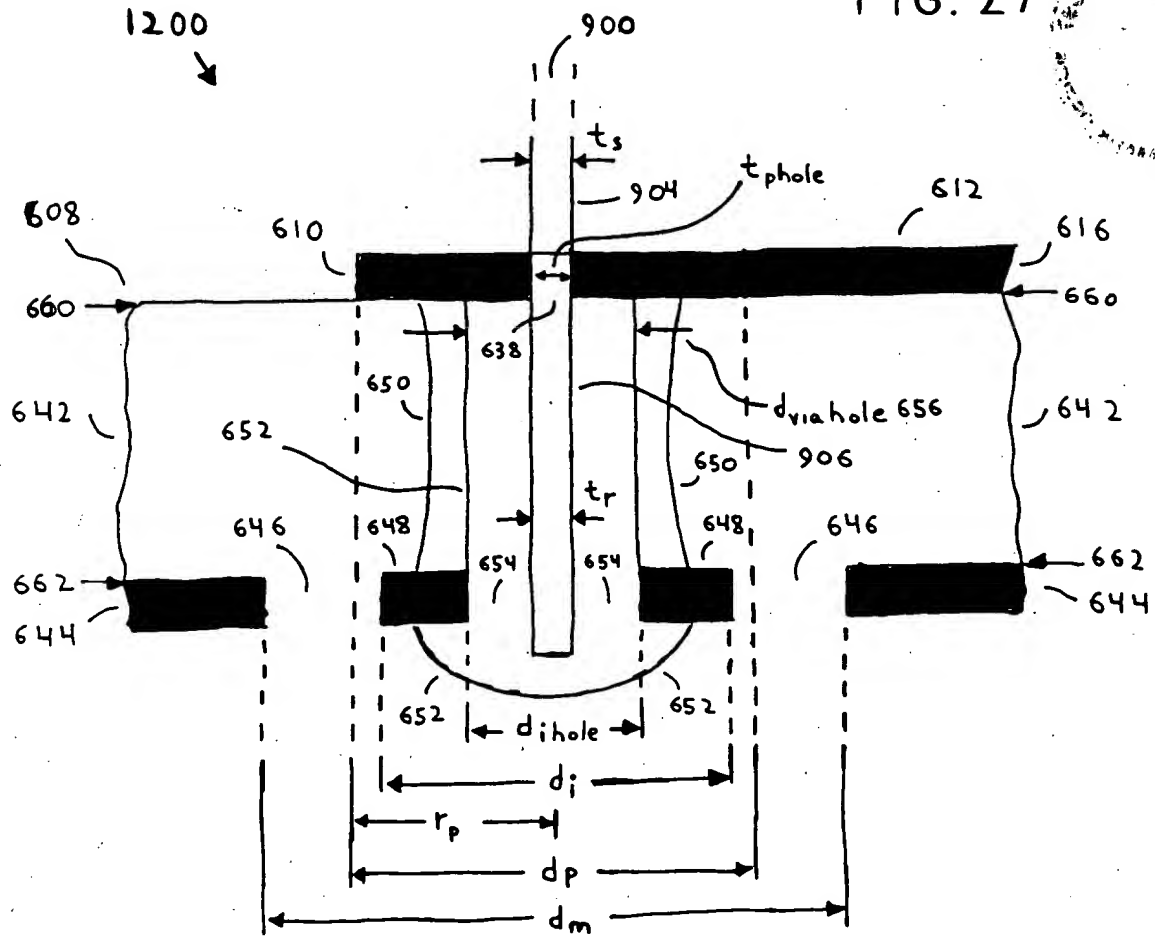


FIG. 27



Input Impedance
 S-Parameters
 Frequency (GHz)

Input Impedance

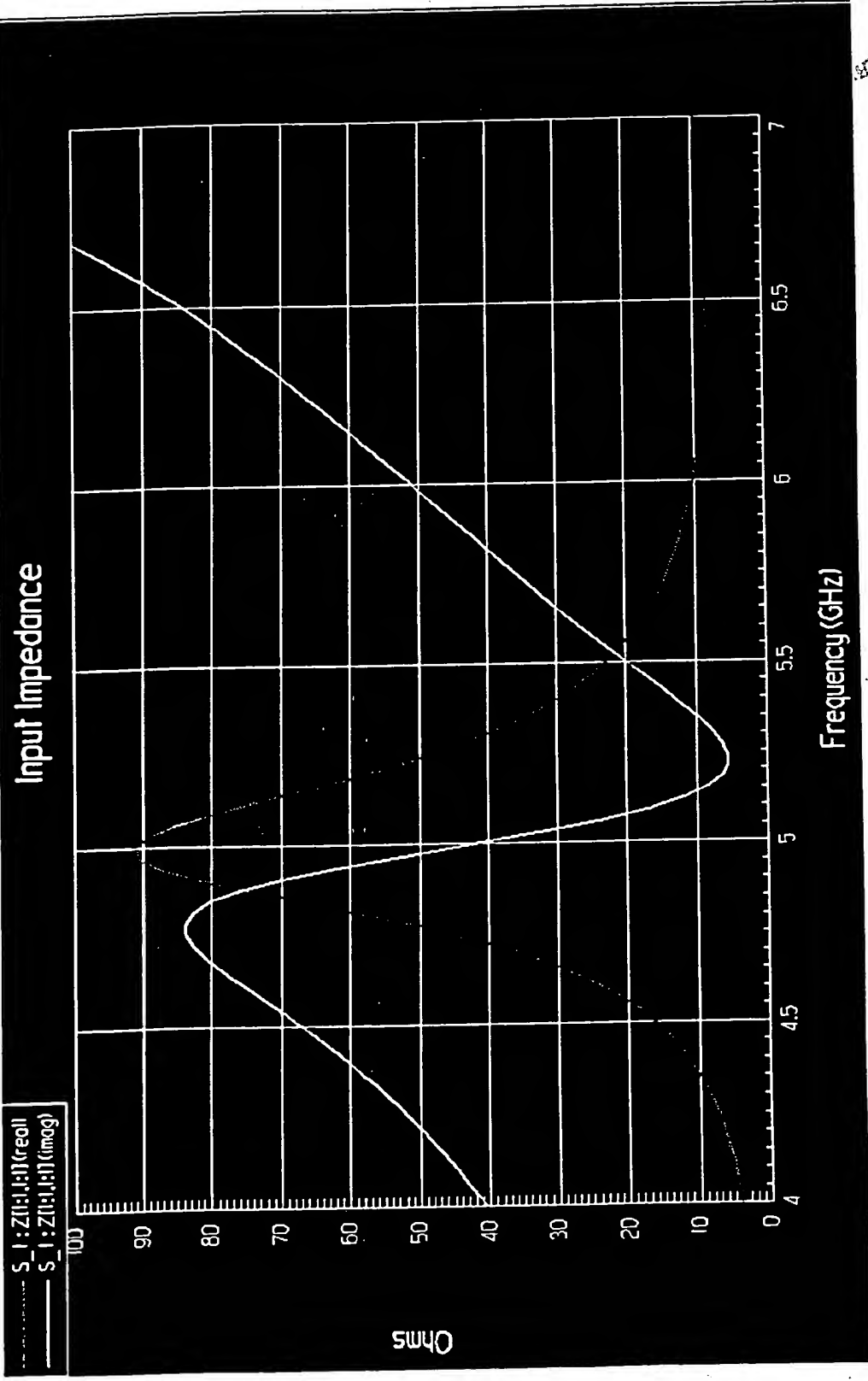


FIG. 28

50 ohm VSWR

50 ohm VSWR

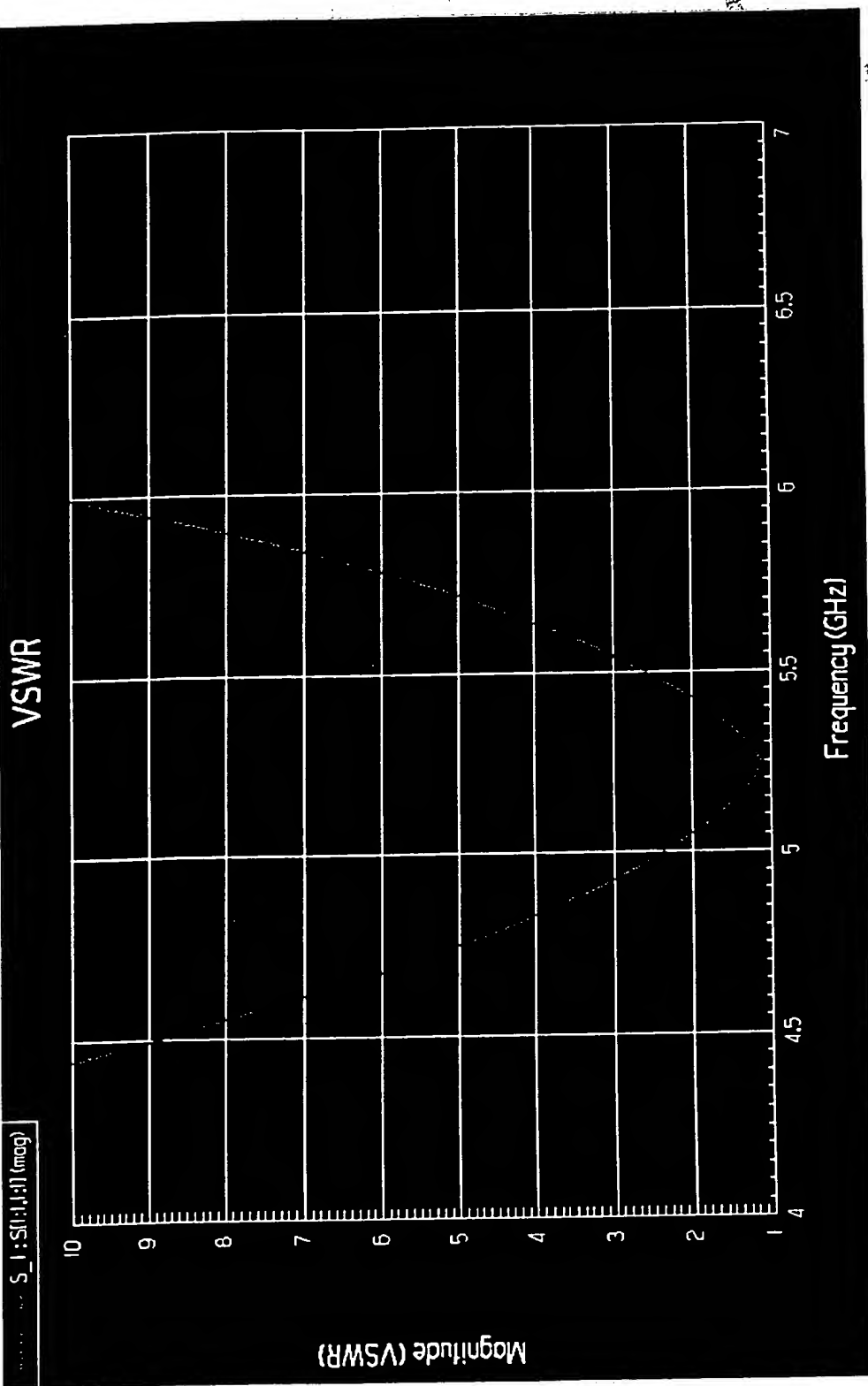


FIG. 29

50 ohm VSWR

50 ohm VSWR

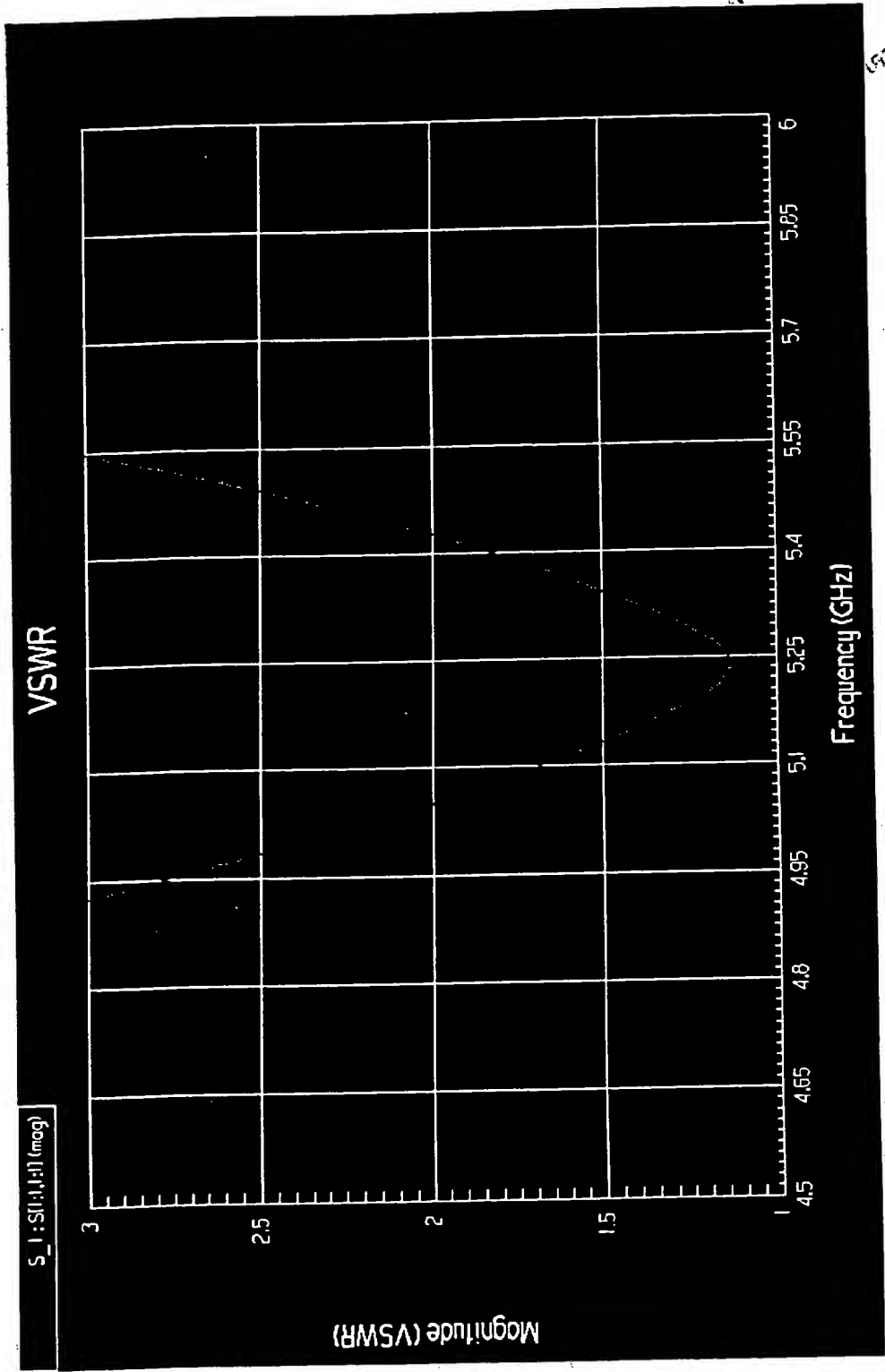


FIG. 30

1. The input impedance is a function of frequency.
 2. The input impedance is a function of the load impedance.
 3. The input impedance is a function of the transmission line parameters.
 4. The input impedance is a function of the distance from the load to the input.

Input Impedance

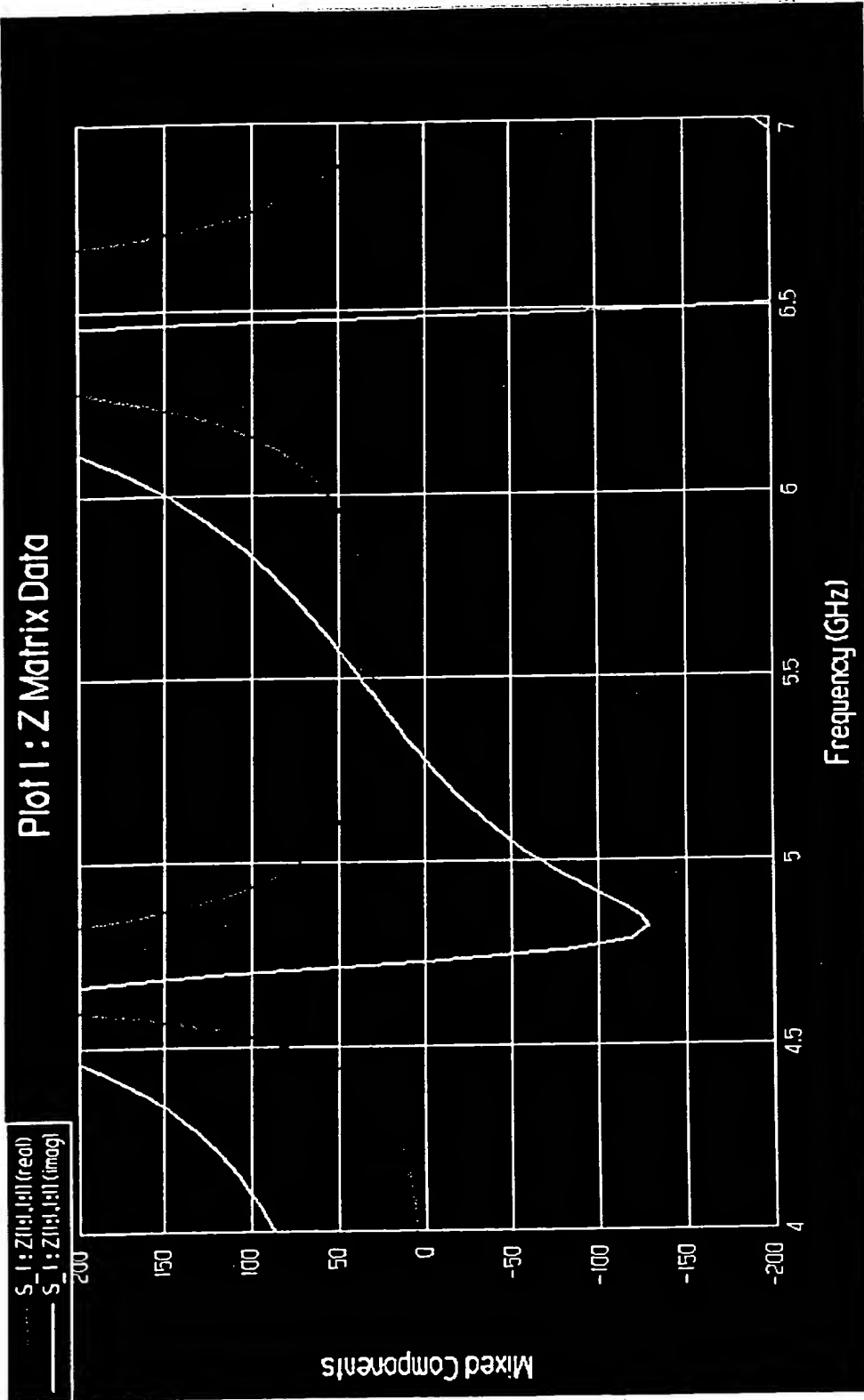


FIG. 31

1. The VSWR is a measure of the quality of the antenna system. It is defined as the ratio of the maximum voltage to the minimum voltage of the standing wave on the antenna. A VSWR of 1.0 indicates a perfect match, while a VSWR of infinity indicates a total mismatch.

50 ohm VSWR

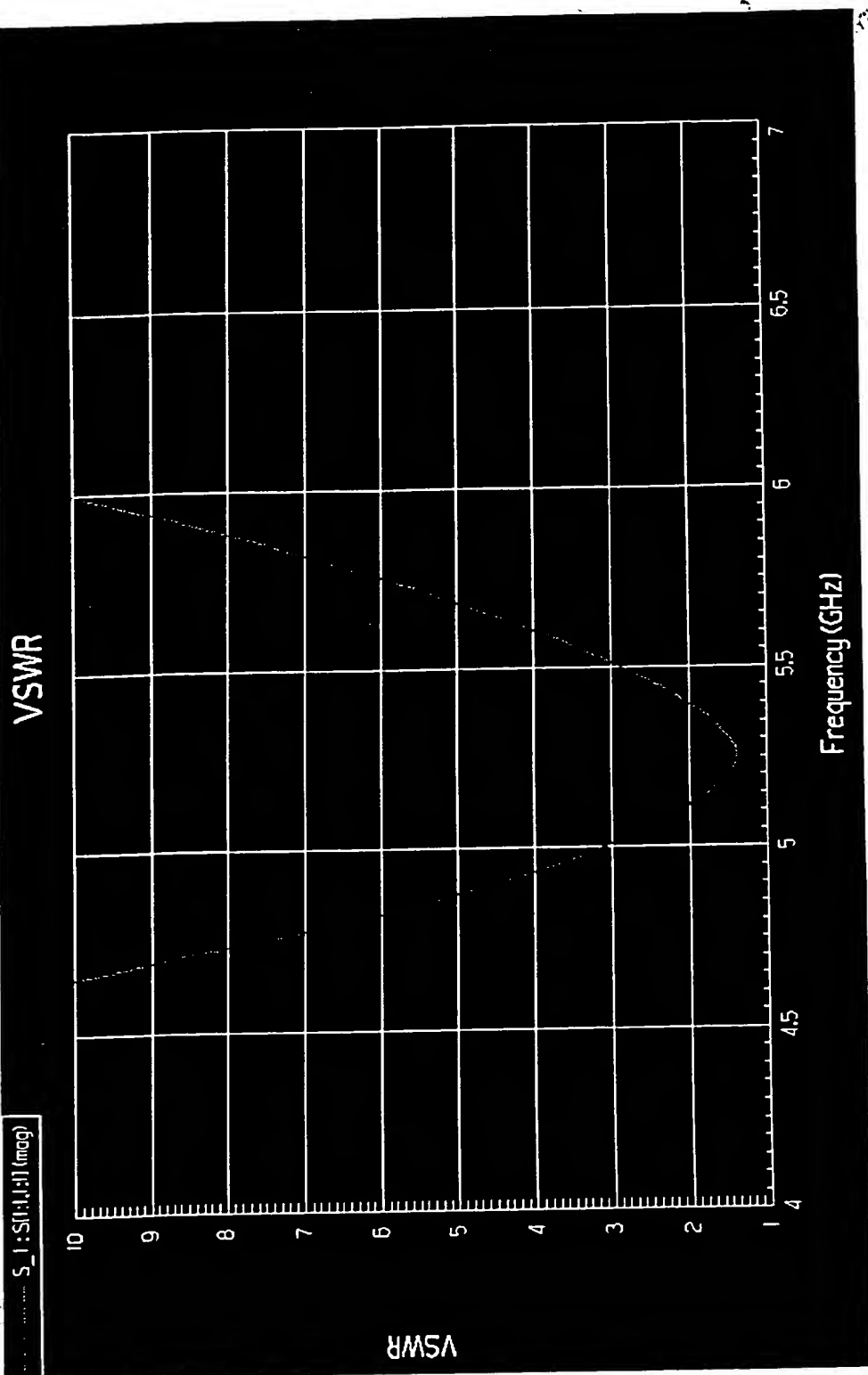


FIG. 32

Year	Age	Sex	Height	Weight	Color	Complexion	Build	Occupation	Education	Religion	Marital Status	Children	Address	City	State	Country
1900	20	M	5' 10"	150	Black	Dark	Medium	Farmer	High School	Methodist	Married	2	1234 Main St.	St. Louis	Mo.	U.S.A.
1901	21	F	5' 5"	120	Black	Dark	Medium	Housewife	High School	Methodist	Married	2	1234 Main St.	St. Louis	Mo.	U.S.A.
1902	22	M	5' 8"	140	Black	Dark	Medium	Farmer	High School	Methodist	Married	2	1234 Main St.	St. Louis	Mo.	U.S.A.
1903	23	F	5' 6"	130	Black	Dark	Medium	Housewife	High School	Methodist	Married	2	1234 Main St.	St. Louis	Mo.	U.S.A.
1904	24	M	5' 9"	145	Black	Dark	Medium	Farmer	High School	Methodist	Married	2	1234 Main St.	St. Louis	Mo.	U.S.A.
1905	25	F	5' 7"	135	Black	Dark	Medium	Housewife	High School	Methodist	Married	2	1234 Main St.	St. Louis	Mo.	U.S.A.
1906	26	M	5' 11"	155	Black	Dark	Medium	Farmer	High School	Methodist	Married	2	1234 Main St.	St. Louis	Mo.	U.S.A.
1907	27	F	5' 8"	140	Black	Dark	Medium	Housewife	High School	Methodist	Married	2	1234 Main St.	St. Louis	Mo.	U.S.A.
1908	28	M	5' 10"	150	Black	Dark	Medium	Farmer	High School	Methodist	Married	2	1234 Main St.	St. Louis	Mo.	U.S.A.
1909	29	F	5' 9"	145	Black	Dark	Medium	Housewife	High School	Methodist	Married	2	1234 Main St.	St. Louis	Mo.	U.S.A.
1910	30	M	5' 11"	155	Black	Dark	Medium	Farmer	High School	Methodist	Married	2	1234 Main St.	St. Louis	Mo.	U.S.A.
1911	31	F	5' 10"	150	Black	Dark	Medium	Housewife	High School	Methodist	Married	2	1234 Main St.	St. Louis	Mo.	U.S.A.
1912	32	M	5' 11"	155	Black	Dark	Medium	Farmer	High School	Methodist	Married	2	1234 Main St.	St. Louis	Mo.	U.S.A.
1913	33	F	5' 10"	150	Black	Dark	Medium	Housewife	High School	Methodist	Married	2	1234 Main St.	St. Louis	Mo.	U.S.A.
1914	34	M	5' 11"	155	Black	Dark	Medium	Farmer	High School	Methodist	Married	2	1234 Main St.	St. Louis	Mo.	U.S.A.
1915	35	F	5' 10"	150	Black	Dark	Medium	Housewife	High School	Methodist	Married	2	1234 Main St.	St. Louis	Mo.	U.S.A.
1916	36	M	5' 11"	155	Black	Dark	Medium	Farmer	High School	Methodist	Married	2	1234 Main St.	St. Louis	Mo.	U.S.A.
1917	37	F	5' 10"	150	Black	Dark	Medium	Housewife	High School	Methodist	Married	2	1234 Main St.	St. Louis	Mo.	U.S.A.
1918	38	M	5' 11"	155	Black	Dark	Medium	Farmer	High School	Methodist	Married	2	1234 Main St.	St. Louis	Mo.	U.S.A.
1919	39	F	5' 10"	150	Black	Dark	Medium	Housewife	High School	Methodist	Married	2	1234 Main St.	St. Louis	Mo.	U.S.A.
1920	40	M	5' 11"	155	Black	Dark	Medium	Farmer	High School	Methodist	Married	2	1234 Main St.	St. Louis	Mo.	U.S.A.
1921	41	F	5' 10"	150	Black	Dark	Medium	Housewife	High School	Methodist	Married	2	1234 Main St.	St. Louis	Mo.	U.S.A.
1922	42	M	5' 11"	155	Black	Dark	Medium	Farmer	High School	Methodist	Married	2	1234 Main St.	St. Louis	Mo.	U.S.A.
1923	43	F	5' 10"	150	Black	Dark	Medium	Housewife	High School	Methodist	Married	2	1234 Main St.	St. Louis	Mo.	U.S.A.
1924	44	M	5' 11"	155	Black	Dark	Medium	Farmer	High School	Methodist	Married	2	1234 Main St.	St. Louis	Mo.	U.S.A.
1925	45	F	5' 10"	150	Black	Dark	Medium	Housewife	High School	Methodist	Married	2	1234 Main St.	St. Louis	Mo.	U.S.A.
1926	46	M	5' 11"	155	Black	Dark	Medium	Farmer	High School	Methodist	Married	2				

50 ohm VSWR

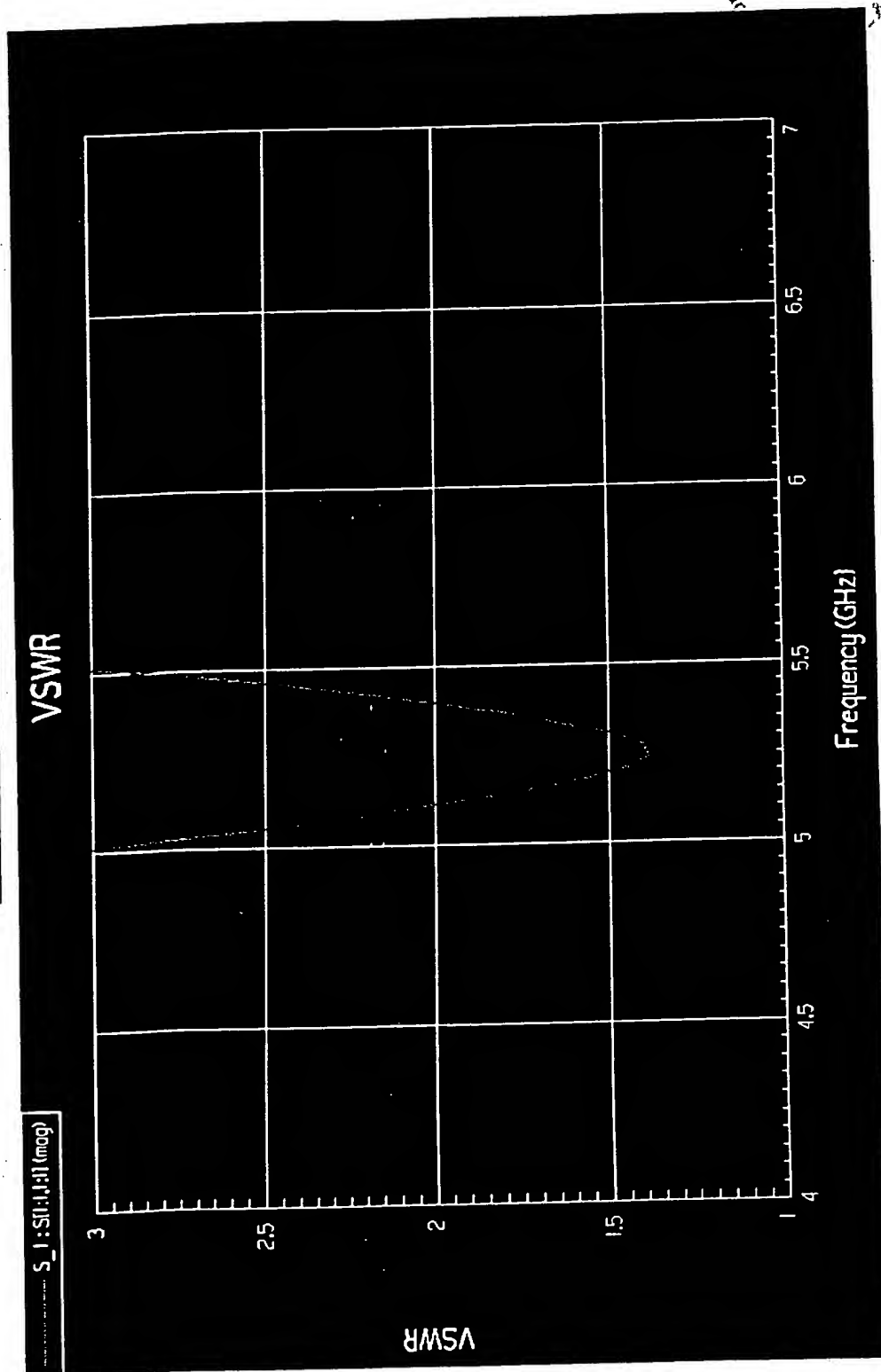


FIG. 33

01410
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WASHINGTON, D.C. 20340

Input Impedance

Impedance for Top Hat Monopole

..... $S_{11}:Z_{in}(f)$ (real)
—— $S_{11}:Z_{in}(f)$ (imag)

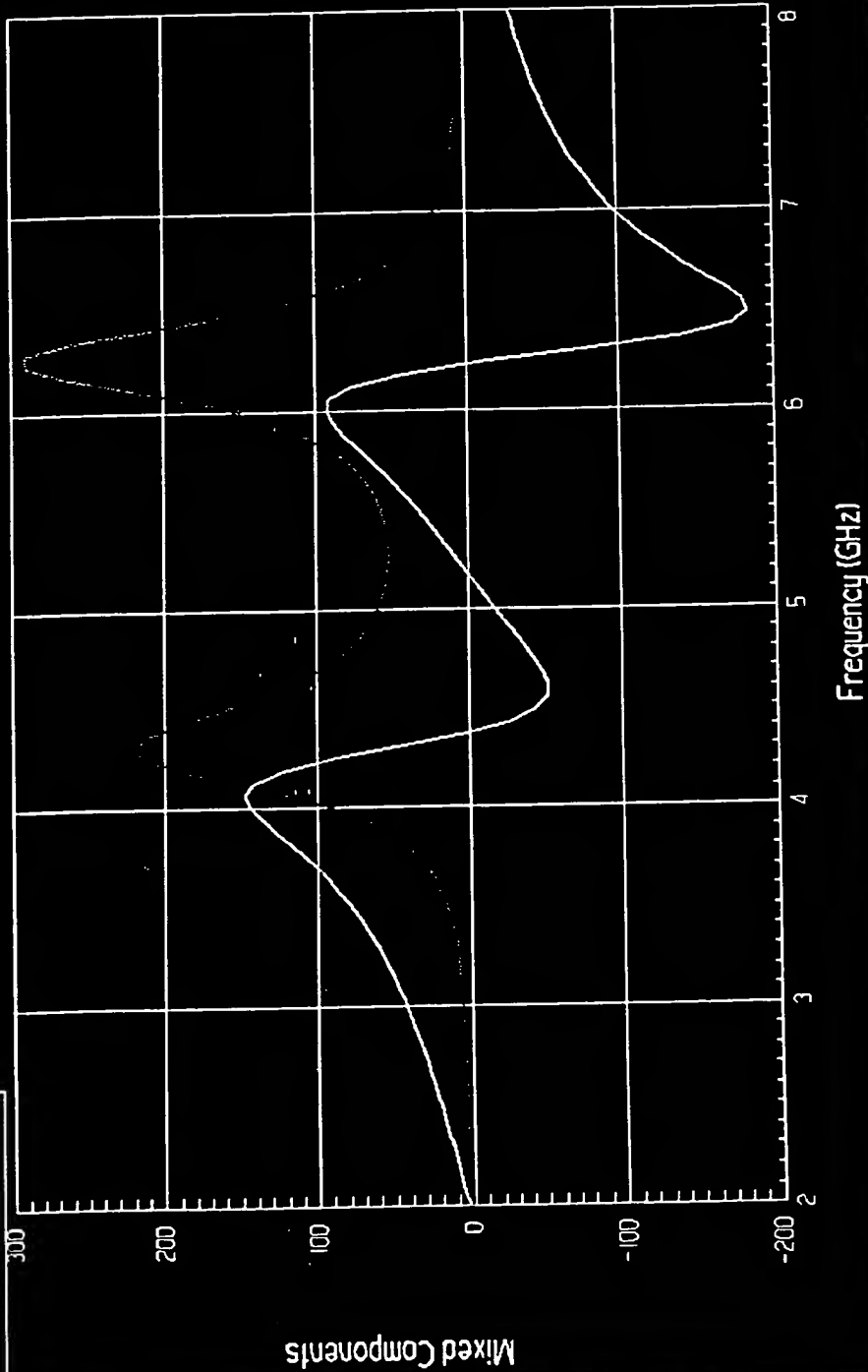


FIG. 34

2711	2712	2713	2714	2715	2716	2717	2718	2719	2720	2721	2722	2723	2724	2725	2726	2727	2728	2729	2730	2731	2732	2733	2734	2735	2736	2737	2738	2739	2740	2741	2742	2743	2744	2745	2746	2747	2748	2749	2750	2751	2752	2753	2754	2755	2756	2757	2758	2759	2760	2761	2762	2763	2764	2765	2766	2767	2768	2769	2770	2771	2772	2773	2774	2775	2776	2777	2778	2779	2780	2781	2782	2783	2784	2785	2786	2787	2788	2789	2790	2791	2792	2793	2794	2795	2796	2797	2798	2799	2800	2801	2802	2803	2804	2805	2806	2807	2808	2809	2810	2811	2812	2813	2814	2815	2816	2817	2818	2819	2820	2821	2822	2823	2824	2825	2826	2827	2828	2829	2830	2831	2832	2833	2834	2835	2836	2837	2838	2839	2840	2841	2842	2843	2844	2845	2846	2847	2848	2849	2850	2851	2852	2853	2854	2855	2856	2857	2858	2859	2860	2861	2862	2863	2864	2865	2866	2867	2868	2869	2870	2871	2872	2873	2874	2875	2876	2877	2878	2879	2880	2881	2882	2883	2884	2885	2886	2887	2888	2889	2890	2891	2892	2893	2894	2895	2896	2897	2898	2899	2900	2901	2902	2903	2904	2905	2906	2907	2908	2909	2910	2911	2912	2913	2914	2915	2916	2917	2918	2919	2920	2921	2922	2923	2924	2925	2926	2927	2928	2929	2930	2931	2932	2933	2934	2935	2936	2937	2938	2939	2940	2941	2942	2943	2944	2945	2946	2947	2948	2949	2950	2951	2952	2953	2954	2955	2956	2957	2958	2959	2960	2961	2962	2963	2964	2965	2966	2967	2968	2969	2970	2971	2972	2973	2974	2975	2976	2977	2978	2979	2980	2981	2982	2983	2984	2985	2986	2987	2988	2989	2990	2991	2992	2993	2994	2995	2996	2997	2998	2999	3000
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5 1 : Z [1 : 1] (real) 5 1 : Z [1 : 1] (imag)



FIG: 35

APPROVED FOR RELEASE BY NSA ON 08-28-2013 pursuant to E.O. 13526

50 ohm VSWR

VSWR for the Top Hat Monopole

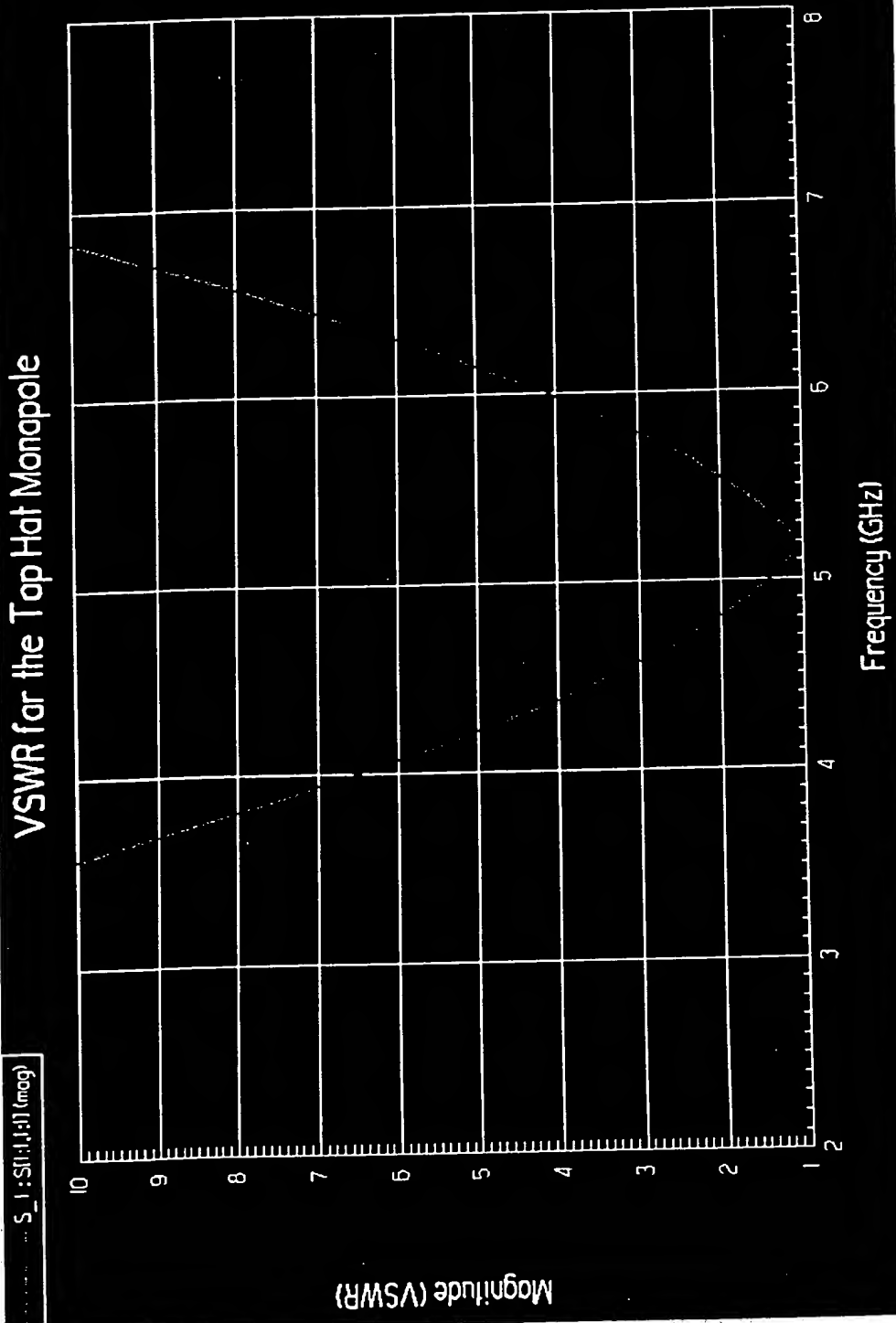


FIG. 36

1000 900 800 700 600 500 400 300 200 100 0

50 ohm VSWR

VSWR for the Top Hat Manopole

S11: S11:1 (mag)

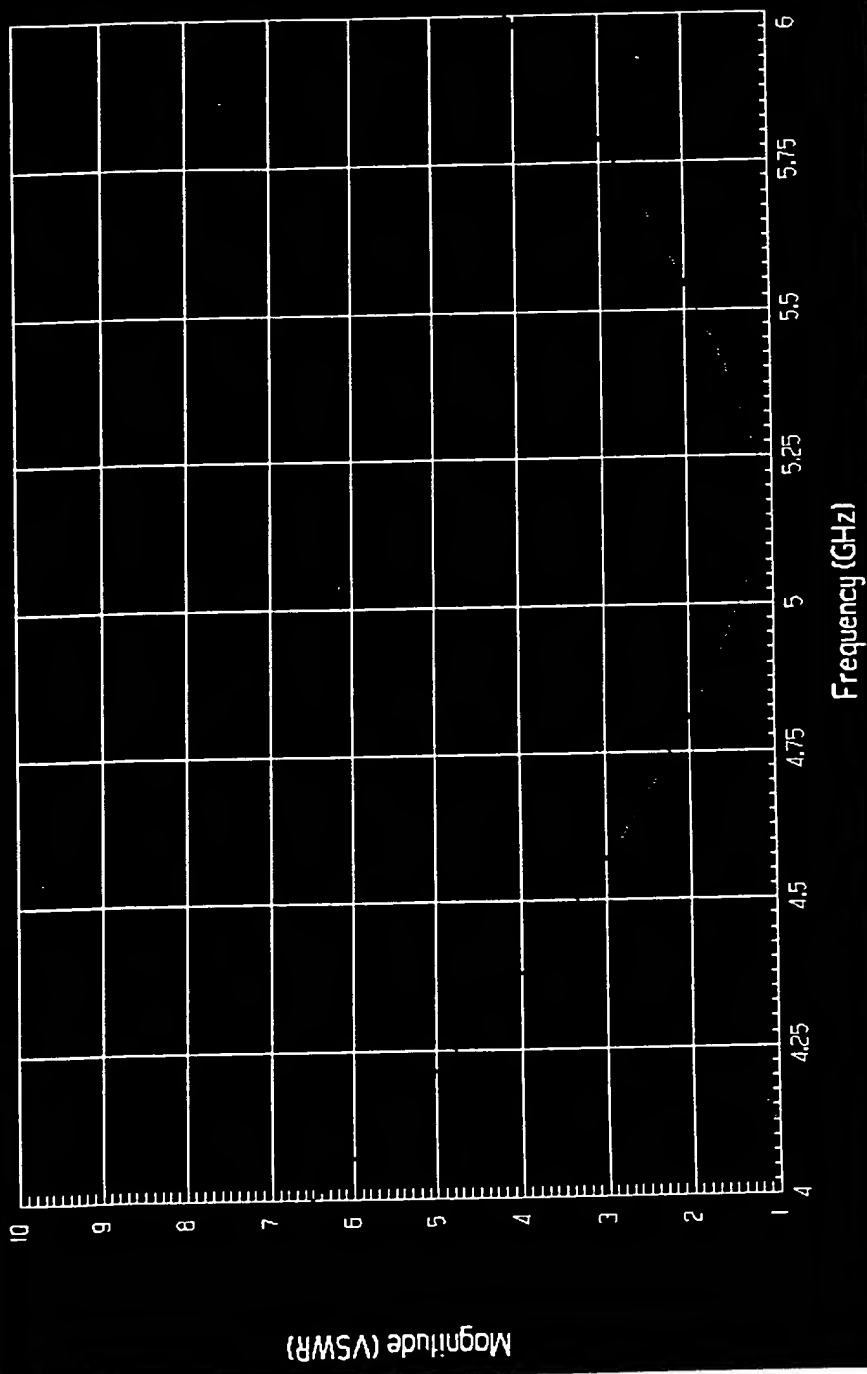


FIG. 37

